

PATENT

Atty. Dkt. No. AVAN/000331

## IN THE CLAIMS:

1. (Currently Amended) A tunable edge-emitting semiconductor laser, comprising:
  - a base;
  - a laser diode coupled to the base;
  - a fixed reflector coupled to the base; and
  - an adjustable reflector positioned with respect to the fixed reflector to delimit a resonant cavity having an active section with a gain length  $L_1$  and a tunable section of length  $L_2$
  - ~~a resonant cavity delimited by a fixed reflector and an adjustable reflector;~~
  - ~~an active section with a gain length  $L_1$  creating a first section of the resonant cavity;~~
  - ~~and~~
  - ~~a tunable section of length  $L_2$  creating a second section of the resonant cavity,~~
  - wherein a total length of the active section and the tunable section is less than or equal to 20  $\mu\text{m}$ .
2. (Previously Presented) The tunable laser according to claim 1, wherein the length  $L_1$  of the active section is from 5  $\mu\text{m}$  to 12  $\mu\text{m}$ .
3. (Currently Amended) The tunable laser according to claim 1, wherein the length  $L_2$  of the tunable section depends on the tuning range of the laser in accordance with the following equation:
 
$$\Delta\lambda = \lambda^2 / 2(n_1 L_1 + n_2 L_2),$$
 where  $\Delta\lambda$  is the tuning range of the laser,  
 $\lambda$  is the emission wavelength of the laser, and  
 $n_1$  and  $n_2$  are the respective refractive indices of the first active and second tunable sections of the laser cavity.
4. (Currently Amended) The tunable laser according to claim 3, wherein the ~~tunable laser~~ has a continuous tuning range  $\Delta\lambda$  is continuous and is greater than or equal to 30 nm.

## PATENT

Atty. Dkt. No. AVAN/000331

5. (Previously Presented) The tunable laser according to claim 1, wherein the fixed reflector and the adjustable reflector each have a reflectivity greater than or equal to 90%.
6. (Previously Presented) The tunable laser according to claim 1, wherein the fixed reflector is an etched mirror.
7. (Previously Presented) The tunable laser according to claim 6, wherein the etched mirror of the fixed reflector is an alternation of semiconductor and air.
8. (Previously Presented) The tunable laser according to claim 6, wherein the etched mirror of the fixed reflector is an alternation of polymer and air.
9. (Previously Presented) The tunable laser according to claim 6, wherein the etched mirror of the fixed reflector is an alternation of semiconductor and polymer.
10. (Previously Presented) The tunable laser according to claim 6, wherein the fixed reflector is on a front face of the active section.
11. (Previously Presented) The tunable laser according to claim 1, wherein a rear face of the active section is antireflection treated.
12. (Previously Presented) The tunable laser according to claim 1, wherein the adjustable reflector is a mirror external to the laser cavity.
13. (Previously Presented) The tunable laser according to claim 12, characterized in that the adjustable reflector is of etched silicon.
14. (Currently Amended) The tunable laser according to claim 12, wherein the adjustable reflector ~~is of~~ comprises nickel.

## PATENT

Any. Dkt. No. AVAN/000331

15. (Currently Amended) The tunable laser according to claim, wherein the adjustable reflector ~~is of~~ comprises dielectric deposited on silicon.
16. (Currently Amended) The tunable laser according to claim 12, wherein the ~~mobile~~ adjustable reflector is controlled by a micro-electro-mechanical (MEM) controller.
17. (Currently Amended) The tunable laser according to claim 1, wherein the tunable section is includes an air area.
18. (Currently Amended) The tunable laser according to claim 1, wherein the tunable section is includes an gas area.
- 19-22. (Canceled)